

REMARKS

Claims Rejections – 35 USC § 103

The rejection of claims 1-4, 6-8, 10, 13 under 35 U.S.C. 103(a) as being unpatentable over Kruyer (US 4,406,793) in view of Duczmal (US 5,192,423) is respectfully traversed for the reasons now following.

Kruyer discloses tumbling an oil in water emulsion in a rotating drum in the presence of free bodies that have oleophilic surfaces. The coalescence of the oil is due to the accumulation of oil on the oleophilic surfaces of the free bodies where the oil unites or coalesces and encourages subsequent flowing or dripping therefrom and not from centrifugal force being generated as in the present invention (see column 5, lines 23-29, wherein Kruyer distinguishes his invention from the prior art).

According to Kruyer, the rotating drum is optimally rotated at the "critical rate of rotation", which is defined in column 8, lines 56-67, as being when, at the apex of the inside drum surface **21**, the centrifugal force equals the force of gravity. If operated above the critical rate, the drum content commences to attach itself to the drum wall and does not readily mix with the remainder of the drum contents, which, according to Kruyer, is undesirable. By maintaining the rotation of the drum at the critical rate, the mixture (*e.g.*, oil in water emulsion) and the free bodies are continuously and thoroughly mixed (see column 9, lines 19-21).

The present invention, on the other hand, comprises injecting an oil sand slurry stream through the inlet of a coalescer to cause the slurry to rotate as it advances longitudinally through the chamber, so that bitumen droplets move inwardly toward the chamber axis and are concentrated, thereby increasing the probability of bitumen droplet contact, coalescence and growth. Unlike Kruyer, the coalescer does not rotate; rather, it is the slurry that rotates as a result of the slurry being injected through the inlet.

In the present invention, it is the centrifugal force, created by causing the slurry to rotate as it proceeds to advance longitudinally through the coalescer chamber, that forces the lighter bitumen and water to migrate inwardly and the heavier sand to migrate outwardly. As stated on page 8, lines

3-4, of the present application, when the slurry stream advances longitudinally through the chamber, the entire stream is now stratified. This is precisely what Kruyer is trying to avoid as the object in Kruyer is to have uniform mixing of the free bodies and the mixture and not segregation/stratification. As Kruyer states in column 9, line 3-5, "[r]otating the drum at more than twice the critical rate is not the intention of the present invention" (emphasis added).

Hence, Kruyer does not disclose or suggest injecting an oil sand slurry stream through the inlet of a coalescer to cause the slurry to rotate and create sufficient centrifugal forces such that the sand migrates towards the walls of the coalescer and the bitumen migrates towards the center of the coalescer for coalescence to occur. In fact, Kruyer teaches away from rotating a slurry such that stratification of the mixture occurs but rather teaches uniform mixing.

Turning next to Duczmal, this reference essentially discloses a mineral flotation device. Duczmal does not teach coalescence of bitumen droplets; rather, Duczmal teaches attachment of lighter hydrophobic particles with air bubbles and moving the hydrophobic particles combined with air bubbles inwardly towards the vortex (see column 8, lines 33-35). Additionally, Duczmal does not disclose or suggest providing an elongated closed vessel; rather, Duczmal discloses a cylindrical chamber **12** having a closed lower end **18** and an open upper end 20 (see column 10, lines 17-20 and FIGS 1 and 3). As particularly stated in column 10, lines 20-27, the liquid is allowed to overflow the upper edge of the chamber **12** into catch basin **24** and the froth overflows from the central portion of the central chamber **20** into froth collector **30**.

Furthermore, catch basin **24** is not equivalent to the separator that receives treated slurry as contemplated in the present invention. The catch basin **24** only receives the liquid and not the froth comprised of air bubbles and hydrophobic particles of interest. The separator in the present invention receives the entirety of the treated slurry stream.

Finally, outlet **32** is provided in the catch basin **24** for removal of particles that sink (see column 10, lines 27-28) in the separated liquid fraction comprising the heavier particles. As further explained in column 11, lines 29-32, of Duczmal, the heavier particles which are carried downwardly in the direction of arrow **62** are removed in the direction of arrow **64** for processing and/or discard.

Thus, outlet **32** is not used to expel the entirety of the treated slurry stream as in the present invention.

There is no suggestion or incentive from either Kruyer or Duczmal to modify the Kruyer tumbler. Furthermore, there would be no motivation to those skilled in the art to combine Kruyer and Duczmal. Kruyer explicitly teaches away from rotating the tumbler so that separation occurs, as the object of the Kruyer tumbler is to promote mixing and not segregation. The Kruyer tumbler relies on entirely different principles to coalesce oil droplets, namely, the mixing of an oil in water emulsion, etc. with hydrophobic free bodies. There would be no motivation to turn the Kruyer tumbler into a flotation apparatus as taught in Duczmal. In summary, it is respectfully submitted that the combination of Kruyer in view of Duczmal does not render obvious to one of ordinary skill in the art the invention as claimed in claims 1-4, 6-8, 10 and 13.

The rejection of claims 1-9, 13 under 35 U.S.C. 103(a) as being unpatentable over Kruyer (US 4,406,793) in view of Duczmal (US 5,192,423) and in further view of Garner (US 7,141,162) is respectfully traversed for all the reasons given above and for the additional reasons now following.

Garner is directed towards the treatment/upgrading of diluted bitumen froth (diluted with a solvent or diluent such as naphtha – see column 3, lines 51-55) and not oil sand slurry. It is understood by those of skill in the art that oil sand slurry, which routinely contains anywhere from 50 to 65 wt % solids, is an entirely different feed than diluted bitumen froth. Bitumen froth is obtained after oil sand slurry is conditioned (*i.e.*, bitumen droplets coalesce and attach to air bubbles etc.) and after the oil sand slurry is either introduced into a primary separation vessel (gravity separation vessel) or a cyclonic separator to separate the bitumen froth from the sand. Thus, the process circuit of Garner would actually use the resultant separated bitumen of the present invention. Hence, a person skilled in the art would not look to Garner for treating oil sand slurry.

In summary, it is respectfully submitted that Kruyer in view of Duczmal and further in view of Garner does not disclose the invention as claimed in claims 1-9, 13. Favorable consideration is respectfully requested.

The rejection of claims 5, 9, 11 under 35 U.S.C. 103(a) as being unpatentable over Kruyer (US 4,406,793) in view of Duczmal (US 5,192,423) and in further view of Nilsen (US 6,872,239) is respectfully traversed for all the reasons given above and for the additional reasons now following.

As argued in applicants' previous Reply, which arguments are incorporated by reference herein, Nilsen discloses a completely distinct method and apparatus from the claimed invention and fails to disclose or suggest a number of the claimed elements. Furthermore, while Nilsen does teach delivering desanded emulsion via emulsion delivery line 9 from cyclone 7 to coalescer 15, delivery line 9 is not operatively connected to the coalescer vessel outlet and does not operate to introduce treated slurry stream into the separator.

In summary, it is respectfully submitted that Kruyer in view of Duczmal and further in view of Nilsen does not disclose the invention as claimed in claims 5, 9, 11. Favorable consideration is respectfully requested.

Amendments and New Claims

The amendment to claim 1 makes it clear that the process is a continuous process and the force which acts to move the bitumen droplets inwardly is a centrifugal force, as stated on page 8, line 2 of the specification. New claims 14 and 15 recite the use of a tangential inlet as disclosed in the specification, page 7, line 16. It is this tangential inlet which in conjunction with the inlet pressure rotates the slurry stream as it advances longitudinally through the chamber. New claims 16 and 17 recite the fact that the elongated closed chamber is stationary, and although this limitation is not set forth *expressis verbis*, it is clear from the description and the use of a tangential feed under pressure that the original disclosure contemplates the use of a stationary chamber, as opposed to a rotating chamber as shown in the references which incorporate an axial feed.

New claims 18 and 19 incorporate both the tangential feed and the stationary chamber as limitations. Claims 20-22 require that the entire contents of the vessel is continuously expelled through the vessel outlet, meaning that there are no "free bodies" left behind, as in the case of the Kruyer reference 4,406,793.

In view of the above remarks, it is believed the application is now in condition for allowance and such allowance is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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